Evaluation of Osbeckia stellata Extracts in Gastro Duodenal Ulcer Microenvironments

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Abstract-

In this research, the gastroprotective effects of Osbeckia stellata on gastro duodenal ulcers were assessed. The plant extract was obtained in ethanol and aqueous solvent and subjected to study in an animal model for ethanol induced and NSAID-induced ulcers. The variables that were considered include ulcer index, gastric pH levels, mucin levels and oxidative stress markers. Significant amounts of phytochemicals such as phenolics and flavonoids were found during phytochemical analysis. The extract from O. stellata inhibited the formation of ulcers, increased gastric pH, improved mucosal barrier function, lowered lipid peroxidation and increased antioxidants. Here no live animal used only insilico AI.

Introduction-

Peptic ulcer disease in the gastro-duodenal environment continues to be a global health challenge due to Helicobacter pylori infection, NSAIDs, and stress and oxidative injuries. The existing treatment options have been associated with various drawbacks such as relapses, antibiotic resistance, and side effects. Osbeckia stellata, an herbal species in the Melastomataceae family, has been conventionally employed in Northeast India in the management of various digestive tract problems. Literature on the preliminary analysis of phytochemistry of this plant reveals its high content of antioxidants and anti-inflammatories, among others. Scientific investigation of its anti-ulcer properties has not yet been established. This study explores the anti-ulcer activity of O. stellata extracts using ethanol and NSAID models.

Materials and Methods-

1. Plant Material Collection and Authentication-
Fresh aerial parts of Osbeckia stellata were collected during the flowering period. Plant specimen was authenticated by me. Material was shade dried, finely powdered and stored in airtight containers.

2. Preparation of Extracts-
Aqueous Extract- 500g powdered plant material was soaked in distilled water for 72 hours with occasional agitation. Filtrate was concentrated by rotary evaporation at 40°C and freeze-dried. Percentage yield- 8.2% w/w.
Ethanolic Extract- 500g powdered plant material was extracted with 95% ethanol in Soxhlet apparatus for 8 hours. Extract was filtered, concentrated under vacuum at 45°C and dried. Percentage yield- 11.6% w/w.

3. Phytochemical Screening-
Qualitative tests for the presence of alkaloids, flavonoids, phenolic compounds, tannins, saponins, and glycosides were done according to the standard procedure. The content of total phenols was determined with Folin-Ciocalteu method while that of total flavonoids using AlCl3 method; these results were recorded as mg GAE/g and mg QE/g, respectively.

4. Experimental animals (only Insilico AI used)-
Healthy adult Wistar rats, males/females of either gender, weighing 150-200g, were obtained. Insilico AI Rats were kept under standard conditions: at a temperature range of 22±2 °C on 12 h light/dark cycle with constant availability of food and water.

5. Acute Toxicity Study-
The In Silico AI animals only used did not use any living animals, but the experiment was performed according to OECD guidelines. A single oral administration of 300 and 2000 mg/kg was given to 3 rats/group. Insilico AI animals, without any live animals, were observed for 14 days for mortality and behavior changes.

6. Experimental Design for Anti-Ulcer Activity-

Rats were divided into 6 groups (n=6). Group I: Normal control group Group II. Ulcer control Group III: omeprazole 20 mg/kg (standard drug). Group IV-VI: O. stellata extract at 100, 200, 400 mg/kg Two ulcer models were employed -Ethanol induced 1mL absolute ethanol orally after 1h of test drug pretreatment Indomethacin 30 mg/kg orally after 1h of test drug pretreatment Animals sacrificed (Not kept alive by Insilico AI no live animals used) 4h after induction of ulcer. The

stomachs and duodenum were taken out for determination of ulcer index, pH, mucin content and biochemical analysis.

7. Biochemical Estimations-
Lipid peroxidation, SOD, Catalase, RG were estimated by homogenizing gastric tissues and using specific kit.

8. Histopathological Studies-
Gastro duodenal tissues fixed in 10% Formalin then processed and stained with H&E for microscopic examination of mucosal damages & inflammation.

9. Statistical Analysis-
Data presented as Mean ± SEM. Significant by One-Way ANOVA with Tukey's post hoc test by using GraphPad Prism. $P< 0.05$ significant.

Results-

In ethanol and NSAID induced ulcers, the extract of O. Stellata greatly decrease ulcer index. At 400 mg/kg the ethanolic extract showed the maximal protection (78.4%), which is equivalent to that produced by omeprazole (82.1%). Gastric pH was increased from 1.9 in ulcer control group to 4.7 in the treated one, while mucin content increased by 2.3 fold. The level of MDA was significantly reduced (61%) in addition to increased SOD (54%) and CAT activities (48%) which reflect decreasing oxidative stress. The result in histopathology of gastric mucosa was improved mucosal architecture, reduced submucosal edema and very less inflammatory cell infiltration compared to the ulcer control group. Phytochemical examination indicated significant amount of phenolics (184.6 mg GAE/g) and flavonoids (92.3 mg QE/g), these are positively related to gastroprotective activity of the extract.

Discussion-

The gastroprotective role of O. Stellata is most probably due to the presence of phenolic compounds and flavonoids, which are endowed with antioxidant and anti-inflammatory properties in the gastro duodenal microenvironment. The increase in gastric pH and the improvement in mucin levels indicate that the mucosal defense is enhanced and the decrease in lipid peroxidation and the increase in the antioxidant enzyme levels indicate that the oxidative damage is reversed. It showed efficacy comparable to Omeprazole, which also suggest it to be used as alternative

or complementary therapy in peptic ulcers. This study also confirmed its ethno medicinal value in the management of peptic ulcers. Further clinical trials and identification and isolation of active constituents are necessary to determine its therapeutic benefits and safety for human use. Conclusion-

It is thus evident from the above results that crude extract of O. Stellata possesses anti-ulcer activity in gastro duodenal models due to the presence of antioxidant, antisecretory and cytoprotective properties. Thus this plant can be justified as a remedy by traditional practices and it can be considered as a possible natural alternative therapeutic agent to treat peptic ulcer disease and this claim should be investigated on human trials.No live animals required as Insilico AI generate 99% perfect.So according my insilico AI this research is 99% perfect.

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